BS ISO/IEC 30118-5:2021

BSI Standards Publication

# Information technology — Open Connectivity Foundation (OCF) Specification

Part 5: OCF device specification

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# National foreword

This British Standard is the UK implementation of ISO/IEC 30118-5:2021. Together with BS ISO/IEC 30118-5, it supersedes BS ISO/IEC 30118-5:2018, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ICT/1, Information systems co-ordination.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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INTERNATIONAL STANDARD

# ISO/IEC 30118-5

Second edition
2021-10

# Information technology — Open Connectivity Foundation (OCF) Specification —

## Part 5: OCF device specification

*Technologies de l'information — Specification de la Fondation pour la connectivité ouverte (Fondation OCF) —*

*Partie 5: Spécification des appareils OCF*

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# Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see patents.iec.ch).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by the Open Connectivity Foundation (OCF) (as OCF Device Specification, version 2.2.0) and drafted in accordance with its editorial rules. It was adopted, under the JTC 1 PAS procedure, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This second edition cancels and replaces the first edition (ISO/IEC 30118-5:2018), which has been technically revised.

The main changes compared to the previous edition are as follows:

— renaming of smarthome to generic applicable device specification;

— addition of new device types and classification of devices;

— addition of clarifications throughout.

A list of all parts in the ISO/IEC 30118 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

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# Introduction

This document, and all the other parts associated with this document, were developed in response to worldwide demand for smart home focused Internet of Things (IoT) devices, such as appliances, door locks, security cameras, sensors, and actuators; these to be modelled and securely controlled, locally and remotely, over an IP network.

While some inter-device communication existed, no universal language had been developed for the IoT. Device makers instead had to choose between disparate frameworks, limiting their market share, or developing across multiple ecosystems, increasing their costs. The burden then falls on end users to determine whether the products they want are compatible with the ecosystem they bought into, or find ways to integrate their devices into their network, and try to solve interoperability issues on their own.

In addition to the smart home, IoT deployments in commercial environments are hampered by a lack of security. This issue can be avoided by having a secure IoT communication framework, which this standard solves.

The goal of these documents is then to connect the next 25 billion devices for the IoT, providing secure and reliable device discovery and connectivity across multiple OSs and platforms. There are multiple proposals and forums driving different approaches, but no single solution addresses the majority of key requirements. This document and the associated parts enable industry consolidation around a common, secure, interoperable approach.

ISO/IEC 30118 consists of eighteen parts, under the general title Information technology — Open Connectivity Foundation (OCF) Specification. The parts fall into logical groupings as described herein:

- Core framework
  - Part 1: Core Specification
  - Part 2: Security Specification
  - Part 13: Onboarding Tool Specification
- Bridging framework and bridges
  - Part 3: Bridging Specification
  - Part 6: Resource to Alljoyn Interface Mapping Specification
  - Part 8: OCF Resource to oneM2M Resource Mapping Specification
  - Part 14: OCF Resource to BLE Mapping Specification
  - Part 15: OCF Resource to EnOcean Mapping Specification
  - Part 16: OCF Resource to UPlus Mapping Specification
  - Part 17: OCF Resource to Zigbee Cluster Mapping Specification
  - Part 18: OCF Resource to Z-Wave Mapping Specification
- Resource and Device models
  - Part 4: Resource Type Specification
  - Part 5: Device Specification


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- Core framework extensions
  - Part 7: Wi-Fi Easy Setup Specification
  - Part 9: Core Optional Specification
- OCF Cloud
  - Part 10: Cloud API for Cloud Services Specification
  - Part 11: Device to Cloud Services Specification
  - Part 12: Cloud Security Specification

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# Information technology — Open Connectivity Foundation (OCF) Specification —

## Part 5:
## OCF device specification

## 1 Scope

The Device definitions use Resource definitions from ISO/IEC 30118-4.

This document is built on top of ISO/IEC 30118-1. ISO/IEC 30118-1 specifies the core architecture, interfaces protocols and services to enable the implementation of profiles for IoT usages and ecosystems. ISO/IEC 30118-1 also defines the main architectural components of network connectivity, discovery, data transmission, device & service management and ID & security. The core architecture is scalable to support simple devices (constrained devices) and more capable devices (smart devices).

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 30118-1, *Information technology -- Open Connectivity Foundation (OCF) Specification -- Part 1: Core specification*
https://www.iso.org/standard/53238.html

ISO/IEC 30118-2, *Information technology -- Open Connectivity Foundation (OCF) Specification -- Part 2: Security specification*
https://www.iso.org/standard/74239.html

ISO/IEC 30118-4, *Information technology -- Open Connectivity Foundation (OCF) Specification -- Part 4: Resource type specification*
https://www.iso.org/standard/74241.html
Latest version available at:
ISO/IEC 61850-7-1, *Communication networks and systems for power utility automation -- Part 7-1: Basic communication structure -- Principles and models*
https://webstore.iec.ch/publication/6014

OpenAPI specification, fka *Swagger RESTful API Documentation Specification*, Version 2.0
https://github.com/OAI/OpenAPI-Specification/blob/master/versions/2.0.md

IETF RFC 4566, SDP: Session Description Protocol, July 2006
https://tools.ietf.org/html/rfc4566

Draft Report: A Basic Classification System for Energy-Using Products--Universal Device Classification, December 2013
https://eta-intranet.lbl.gov/sites/default/files/lbnl-classification-v1.pdf

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# 3 Terms, definitions and abbreviated terms

## 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 30118-1 and ISO/IEC 30118-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

– ISO Online browsing platform: available at https://www.iso.org/obp

– IEC Electropedia: available at http://www.electropedia.org/

**3.1.1**
**Actuator**
Resource with support of the UPDATE operation.

**3.1.2**
**Sensor**
Resource without support of the UPDATE operation.

**3.1.3**
**Healthcare Device**
Device that is conformant to the normative requirements contained in Annex C of this document.

## 3.2 Symbols and abbreviated terms

| | |
|---|---|
| CGM | Continuous Glucose Monitor |
| CRUDN | Create Retrieve Update Delete Notify |
| CSV | Comma Separated Value |
| NREM | Non Rapid Eye Movement |
| REM | Rapid Eye Movement |
| REST | Representational State Transfer |
| SDP | Session Description Protocol |
| UDC | Universal Device Classification |

# 4 Document conventions and organization

## 4.1 Conventions

In this document a number of terms, conditions, mechanisms, sequences, parameters, events, states, or similar terms are printed with the first letter of each word in uppercase and the rest lowercase (e.g., Network Architecture). Any lowercase uses of these words have the normal technical English meaning.

In this document, to be consistent with the IETF usages for RESTful operations, the RESTful operation words CRUDN, CREATE, RETRIVE, UPDATE, DELETE, and NOTIFY will have all letters capitalized. Any lowercase uses of these words have the normal technical English meaning.


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## 4.2 Notation

In this document, features are described as required, recommended, allowed or DEPRECATED as follows:

Required (or shall or mandatory).

These basic features shall be implemented. The phrases "shall not", and "PROHIBITED" indicate behaviour that is prohibited, i.e. that if performed means the implementation is not in compliance.

Recommended (or should).

These features add functionality supported by a Device and should be implemented. Recommended features take advantage of the capabilities a Device, usually without imposing major increase of complexity. Notice that for compliance testing, if a recommended feature is implemented, it shall meet the specified requirements to be in compliance with these guidelines. Some recommended features could become requirements in the future. The phrase "should not" indicates behaviour that is permitted but not recommended.

Allowed (or allowed).

These features are neither required nor recommended by a Device, but if the feature is implemented, it shall meet the specified requirements to be in compliance with these guidelines.

Conditionally allowed (CA).

The definition or behaviour depends on a condition. If the specified condition is met, then the definition or behaviour is allowed, otherwise it is not allowed.

Conditionally required (CR).

The definition or behaviour depends on a condition. If the specified condition is met, then the definition or behaviour is required. Otherwise the definition or behaviour is allowed as default unless specifically defined as not allowed.

DEPRECATED

Although these features are still described in this document, they should not be implemented except for backward compatibility. The occurrence of a deprecated feature during operation of an implementation compliant with the current document has no effect on the implementation's operation and does not produce any error conditions. Backward compatibility may require that a feature is implemented and functions as specified but it shall never be used by implementations compliant with this document.

Strings that are to be taken literally are enclosed in "double quotes".

Words that are emphasized are printed in *italic*.

## 4.3 Data types

See ISO/IEC 30118-1.

## 4.4 Document structure

This document describes specific requirements governing the indication of Device Types on Devices and the requirements that are associated with specific Device Types themselves. The document makes use of functionality defined in the ISO/IEC 30118-1 and ISO/IEC 30118-4.

Annex A specifies the Device Types that shall be used by an OCF Device.

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Annex B specifies the profiles that that shall be used by an OCF Device that is part of the Smart Home vertical.

Annex C specifies the profiles that shall be used by an OCF Device that is part of the Healthcare vertical.

Annex D specifies the profiles that shall be used by an OCF Device that is part of the Industrial vertical.

Annex E specifies the profiles that shall be used by an OCF Device that is part of a Photovoltaic system.

This document further describes which constructs are used for a Device and which Resources are mandated to be implemented for each Device. A typical Device consisting of data elements defined in the referenced documents is depicted in Figure 1.

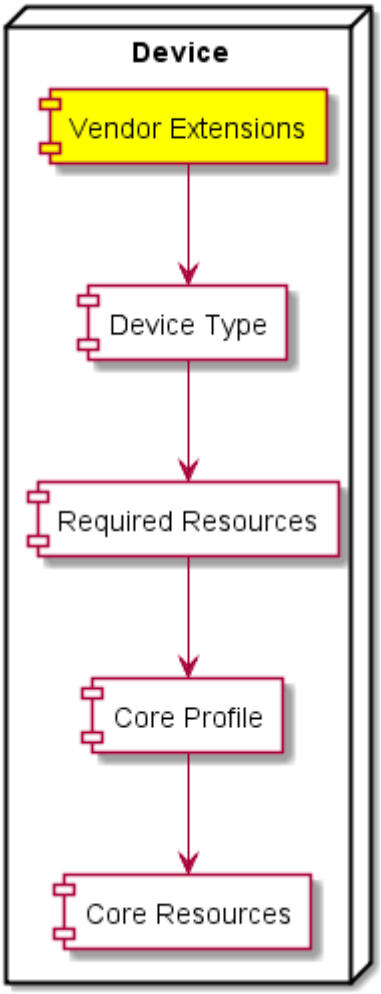


**Figure 1 – Device building blocks**

# 5 Operational scenarios

## 5.1 Document version

All Devices conformant to this document shall add the string "ocf.sh.1.3.0" to the dmv Property in oic.wk.d. This Property is for legacy Device support only and will no longer be revised in alignment with document versions.


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# 6 Core Resource model

## 6.1 Introduction

The Core Resource model is described in ISO/IEC 30118-1.

## 6.2 Device Type

The Device Types of all devices shall have a Resource Type name ("rt") prefixed with "oic.d."

Examples of Device Types are:

– oic.d.fan

– oic.d.thermostat

The full list of defined Device names and types are in Table A.2, Annex B, Annex C, Annex D, and Annex E detail the minimal Resource(s) that a Device shall implement for a specific Device Type where required by a vertical. A Device may expose additional OCF and 3rd party defined Resources other than those indicated in these Annexes.

ISO/IEC 30118-1 defines a Device Resource with a URI of "/oic/d". A Device shall include in the "Resource Type" Property of "/oic/d" the Device Type (or Device Types) from Table A.2 of the physical device hosting the Server; the inclusion of the Device Type shall be done using one of the methods provided by clause 11.3.4 of ISO/IEC 30118-1 (i.e. add to the array of values).

ISO/IEC 30118-1 supports the inclusion of a Device Type as part of the Resource Type of a Collection (see also clause 7.4), in such cases the Collection shall include the Resource Types defined as mandatory for the Device Type by this document. For example, if a Collection Resource has an "rt" value of ["oic.d.light"], the Collection includes an instance of "oic.r.switch.binary" which is mandatory for an "oic.d.light" as per clause B.1.

Therefore a Device may be discovered by adding a query for the "rt" of the Device Type itself (e.g. "?rt=oic.d.fan") to the multicast Endpoint discovery method (see 8.1).

## 6.3 Profile of ISO/IEC 30118-1

This clause describes the profiling of the Core Resources and transport mechanisms and functions that are defined in ISO/IEC 30118-1.

The required ISO/IEC 30118-1 Resources are also required for a profile implementation.

In addition to the required Resources the optional ISO/IEC 30118-1 Resources in Table 1 shall be required.

**Table 1 – Required Resources for Devices**

| Resource ("rt") | Required in Profile |
|---|---|
| Intentionally left blank | Intentionally left blank |

For each of the Resources listed in Table 1, Table 2 details the Properties within those Resources that shall be required.

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**Table 2 – Required properties in Resource**

| Resource ("rt") | Property name | Required in Profile |
|---|---|---|
| Intentionally left blank | Intentionally left blank | Intentionally left blank |

A Device shall support CoAP based endpoint discovery as defined in clause 10.3 of ISO/IEC 30118-1.

The messaging protocol for a Device shall be CoAP (see ISO/IEC 30118-1).

A Device shall support a network layer as defined in clause 9 of ISO/IEC 30118-1 including any necessary defined bridging functions that ensure inter-operability with IPv6.

## 6.4 Third (3rd) party specified extensions

This clause describes how a 3rd party may add Device Types, Resource Types, 3rd party defined Properties to an existing or 3rd party defined Resource Type, 3rd party defined enumeration values to an existing enumeration and 3rd party defined Parameters to an existing defined Property.

A 3rd party may specify additional (non-OCF) Resources within an OCF Device. A 3rd party may also specify additional Properties within an existing OCF defined Resource Type. Further a 3rd party may extend an OCF defined enumeration with 3rd party defined values.

A 3rd party defined Device Type may expose both 3rd party and OCF defined Resource Types. A 3rd party defined Device Type must expose the mandatory Resources for all OCF Devices defined within this document.

A 3rd party defined Resource Type shall include any mandatory Properties defined in this document and also any vertical specified mandatory Properties. All Properties defined within a 3rd party defined Resource Type that are part of the OCF namespace that are not Common Properties as defined in this document shall follow the 3rd party defined Property rules in Table 3.

Table 3 defines the syntax rules for 3rd party defined Resource Type elements. Within the table the term "Domain_Name" refers to a domain name that is owned by the 3rd party that is defining the new element.

**Table 3 – 3rd party defined Resource elements**

| | Resource Element | Vendor Definition Rules |
|---|---|---|
| New 3rd party defined Device Type | "rt" Property Value of "/oic/d" | "x.<Domain_Name>.<Resource identification>" |
| New 3rd party defined Resource Type | "rt" Property Value | "x.<Domain_Name>.<Resource identification>" |
| New 3rd party defined Property within the OCF namespace | Property Name | "x.<Domain_Name>.<Property>" |
| Additional 3rd party defined values in an OCF specified enumeration | Enumeration Property Value | "x.<Domain_Name>.<enum value>" |
| Additional 3rd party defined Parameter in an OCF specified Property | Parameter key word | x.<Domain_Name>.<parameter keyword> |

With respect to the use of the Domain_Name in this scheme the labels are reversed from how they appear in DNS or other resolution mechanisms. The 3rd party defined Device Type and Resource Type otherwise follow the rules defined in ISO/IEC 30118-1. 3rd party defined Resource Types should be registered in the IANA Constrained RESTful Environments (CoRE) Parameters registry.


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For example:

```
x.com.samsung.galaxyphone.accelerator
x.com.cisco.ciscorouterport
x.com.hp.printerhead
x.org.allseen.newinterface.newproperty
```

## 6.5 Semantic Tags

### 6.5.1 Introduction

Semantic Tags are meta-information associated with a specific Resource instance that are represented as both Link Parameters and Resource Properties that provide a mechanism whereby the Resource be annotated with additional contextual metadata that helps describe the Resource. The requirements are defined in ISO/IEC 30118-1, but clauses 6.5.2 and 6.5.3 define additional Device specific requirements.

### 6.5.2 "tag-pos-desc" or position description Semantic Tag

In addition to the requirements defined in ISO/IEC 30118-1 the following requirements will apply:

– This Semantic Tag should not contain any 3rd party defined values (see clause 6.4).

### 6.5.3 "tag-func-desc" or function description Semantic Tag

In addition to the requirements defined in ISO/IEC 30118-1 the following requirements will apply:

– This Semantic Tag when exposed shall be populated with a value from the currently supported set of standardized enumeration values defined in clause B.2.2.

– This Semantic Tag should not contain any 3rd party defined values (see clause 6.4).

# 7 Modelling of multiple logical Devices

## 7.1 Introduction

A physical Device may be modelled as a single Platform and Device, a single Platform with multiple Devices, multiple separately discoverable discrete Platforms and Devices, or as a single Platform and Device where the Device is represented as a composition of other Devices.

For example, a door that includes the functionality of a contact sensor, a lock and a camera may be modeled as a single-Platform, a multi-Platform, or a Composite Device. Each of these three options will be detailed in clauses 7.2, 7.3, and 7.4.

## 7.2 Single platform model

The physical Device exposes one or more logical Devices that are independently discoverable (i.e. they separately respond to multicast discovery request messages as defined in clause 11.3 of ISO/IEC 30118-1). Given the door example there could be a single discovery response with an instance of "/oic/d" that exposes a single Device Type (such as "oic.d.door") or multiple discovery responses, each response having a single Device Type in the "rt" of "/oic/d" that represents the logical Device. The common denominator being that for all discovered logical Devices the Properties of "/oic/p" have the same values.

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## 7.3 Multi-platform model

Just like the single-Platform model, one or more logical Devices that make up a physical Device respond independently to multicast discovery request messages and expose their own Resources. Like the single-platform model, each logical Device exposes a single Device Type in the "rt" value of "/oic/d". The difference from the single-platform model is that each logical Device does not have the same values for the Properties of "oic/p".

## 7.4 Composite Device model

When modelling a Server as a Composite Device there shall be a single Platform which represents the Composite Device. The Resource Type Property Value of "/oic/d" exposed should contain all of the Device Types of the Devices that compose the Composite Device. For each Device that is part of the Composite Device when using this approach there shall exist a Collection that represents one of the distinct Devices in the composition. Further each Collection shall have a Resource Type that at a minimum includes the Device Type that the Collection represents (e.g. ["oic.d.door"]).

Figure 2 illustrates the response to a discovery request using the baseline Interface on "/oic/res" for a Composite Device modeled as described in this clause. Figure 3 illustrates the response to a unicast RETRIEVE request using the baseline Interface to the Collection that represents the door Device.


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```
[
 {
  "rt": ["oic.wk.res"],
  "if": ["oic.if.baseline", "oic.if.ll" ],
  "links":
   [
    {
     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
     "href": "/oic/d",
     "rt":   ["oic.wk.d","oic.d.door","oic.d.sensor","oic.d.lock","oic.d.camera"],
     "if":   ["oic.if.r","oic.if.baseline"],
     "p":    {"bm": 3},
     "eps": [{"ep": "coap://[fe80::b1d6]:1111"}]
    },
    {
     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
     "href": "/mydevice/mydoor",
     "rt":   ["oic.d.door"],
     "if":   ["oic.if.ll","oic.if.baseline","oic.if.r"],
     "p":    {"bm": 3},
     "eps": [{"ep": "coaps://[fe80::b1d6]:1111"}]
    },
    {
     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
     "href": "/mydevice/mysensor",
     "rt":   ["oic.d.sensor"],
     "if":   ["oic.if.ll","oic.if.baseline","oic.if.r"],
     "p":    {"bm": 3},
     "eps": [{"ep": "coaps://[fe80::b1d6]:1111"}]
    },
    {
     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
     "href": "/mydevice/mylock",
     "rt":   ["oic.d.lock"],
     "if":   ["oic.if.ll","oic.if.baseline","oic.if.r"],
     "p":    {"bm": 3},
     "eps": [{"ep": "coaps://[fe80::b1d6]:1111"}]
    },
    {
     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
     "href": "/mydevice/mycamera",
     "rt":   ["oic.d.camera"],
     "if":   ["oic.if.ll","oic.if.baseline","oic.if.r"],
     "p":    {"bm": 3},
     "eps": [{"ep": "coaps://[fe80::b1d6]:1111"}]
    }
   ]
 }
]
```


**Figure 2 – Example composite Device model**

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```
{
"rt": ["oic.d.door"],
"if": ["oic.if.ll","oic.if.r","oic.if.baseline"],
  "id": "unique_example_id",
  "di":   "dc70373c-1e8d-4fb3-962e-017eaa863989",
  "icv":  "ocf.1.3.0",
  "dmv":  "ocf.res.1.3.0, ocf.sh.1.3.0",
  "piid": "6F0AAC04-2BB0-468D-B57C-16570A26AE48",
  "links": [
   {
     "href": "/mydoor/openlevel",
     "rt":   ["oic.r.openlevel"],
     "if":   ["oic.if.a", "oic.if.baseline"],
      "p": {"bm": 2},
     "eps": [
       {"ep": "coaps://[fe80::b1d6]:1122"}
     ]
   }
  ]
}
```


**Figure 3 – RETRIEVE Response to example door from composite Device model**

# 8 Discovery

## 8.1 Endpoint discovery

Clients may discover Servers by using the mechanisms defined by ISO/IEC 30118-1 clause 10. A Client may populate an "rt" query parameter with the Device Types that the Client wants to discover, or if no "rt" query parameter is provided then the search is for all available Device Types irrespective.

Devices may be discovered by Device Type or implemented Resource Type. This difference is conveyed by the population of any "rt" query parameter included as part of discovery (see clause 11.3 of ISO/IEC 30118-1).

The values that may be used for discovering a specific Device Type are listed in Table A.2. The values that may be used to discover a specific Resource Type are listed in clause 6 of ISO/IEC 30118-4.

The discovery process provides the base URI of the Device that is acting as a Server to the Client. The structure of the detected Device can then be retrieved by Resource Discovery.

## 8.2 Resource discovery

Clause intentionally left blank

# 9 Security

A Device shall implement the mandated Security Virtual Resources specified in the ISO/IEC 30118-2. Additionally, all exposed ISO/IEC 30118-4 defined Resources shall be accessible via at least one secure Endpoint (i.e. use of a "coaps" or "coaps+tcp" scheme locator within the "eps" Parameter exposed by /oic/res; see ISO/IEC 30118-1 clause 10.2.4). A Device shall not expose ISO/IEC 30118-4 defined Resources using unsecured Endpoints (i.e. "coap" or "coap+tcp" scheme locator in the "eps" Parameter).


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With the exception of those Resources related to Discovery that are explicitly identified by the ISO/IEC 30118-1 as not requiring secured access (see ISO/IEC 30118-1 clause 11.3.4), all other Resources defined in ISO/IEC 30118-1 implemented in the Smart Home Device shall be accessible via at least one secure Endpoint (i.e. use of a "coaps" or "coaps+tcp" scheme locator within the "eps" Parameter exposed by /oic/res). Similarly, any Resources defined in ISO/IEC 30118-1 that do not require unsecured access that are not listed in /oic/res shall also be accessible via "coaps" or "coaps+tcp".

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# Annex A
(normative)

# Device categories and device types

## A.1 Device categories

Devices are grouped into Device Categories based on the Universal Device Classification (UDC) (see A Basic Classification System for Energy-Using Products--Universal Device Classification), all Device Categories are listed in Table A.1.

**Table A.1 – List of device categories**

| Device Category Name | Description |
|---|---|
| Space Conditioning | Heating and cooling systems |
| Lighting | |
| Appliance | Also known as "white goods"; covers major appliances only. |
| Electronics | Personal electronics |
| Miscellaneous | Small appliances, other |
| Infrastructure | Physical building and infrastructure |
| Transportation | Vehicles, fixed devices that provide movement (e.g. Escalators) |
| Fitness | Includes lifestyle |
| Medical | |
| Personal Health | |
| Other | |

## A.2 Device Types

The complete Universal Device Classification with Device Types per Device Category is provided in Table A.2. Note that not all Devices within the UDC classification have equivalent OCF defined Device Types. All defined Device Types are of the form "oic.d.<thing>" where <thing> is a single alphanumeric string (lower case [a..z],[0..9] only) no more than 24 characters in length giving a total maximum length of the Device Type of 32 characters. Where an abbreviated form of the Device Type is required (applicable only to population of a Wi-Fi beacon IE) then the "oic.d." portion of the Device Type may be omitted.

Table A.2 does not specify the mandatory Resources that are implemented by an instance of such a Device Type; the set of applicable mandatory Resources is dependent on the application domain. In this document the following domains are specified: Smart Home, Healthcare. The "Reference" column in the table references vertical specific annexes where the Device Type is further refined (e.g. mandatory Resources).


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**Table A.2 – Per category list of Device Types**

| Device Category Name | UDC Device Name | Device Name | Device Type (Normative) | Reference |
|---|---|---|---|---|
| Space Conditioning | Unitary System | Air Conditioner | oic.d.airconditioner | B.1 |
| | Boiler | Water Heater | oic.d.waterheater | B.1 |
| | Furnace | Furnace | oic.d.furnace | |
| | Pump | Pump | oic.d.pump | |
| | Fan | Fan | oic.d.fan | B.1 |
| | Condensing Unit | Condensing Unit | oic.d.condensingunit | |
| | Condenser | Condenser | oic.d.condenser | |
| | Humidifier | Humidifier | oic.d.humidifier | B.1 |
| | Dehumidifier | Dehumidifier | oic.d.dehumidifier | B.1 |
| | HVAC – Control | Thermostat | oic.d.thermostat | B.1 |
| | HVAC - Other | HVAC | oic.d.hvac | |
| | | Air Purifier | oic.d.airpurifier | B.1 |
| | | Air Quality Monitor | oic.d.airqualitymonitor | B.1 |
| | | | | |
| Lighting | Lighting - Controls | Lighting Controls | oic.d.lightingcontrol | |
| | Lighting - Other | Light | oic.d.light | B.1 |
| | | | | |
| Appliance | Airer | Airer | oic.d.airer | B.1 |
| | Clothes Dryer | Dryer (Laundry) | oic.d.dryer | B.1 |
| | Clothes Washer | Washer (Laundry) | oic.d.washer | B.1 |
| | | Clothes Washer Dryer | oic.d.washerdryer | B.1 |
| | Dishwasher | Dishwasher | oic.d.dishwasher | B.1 |
| | Freezer | Freezer | oic.d.freezer | B.1 |
| | Ice Machine | Ice Machine | oic.d.icemachine | |
| | Indoor Garden | Indoor Garden | oic.d.indoorgarden | B.1 |
| | Mattress | Mattress | oic.d.mattress | B.1 |
| | Oven | Oven | oic.d.oven | B.1 |
| | Range | Range | oic.d.range | |
| | Refrigerator | Refrigerator | oic.d.refrigerator | B.1 |
| | Water Heater | Water Heater | oic.d.waterheater | B.1 |
| | Water Purifier | Water Purifier | oic.d.waterpurifier | B.1 |
| | Appliance – Other | Cooker Hood | oic.d.cookerhood | B.1 |
| | | Cooktop | oic.d.cooktop | B.1 |
| | | Steam Closet | oic.d.steamcloset | B.1 |
| | | | | |

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